

Male Osteoporosis Matters A Call to Action

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Table of contents

01

Introduction

Osteoporosis
Gender Differences in Osteoporosis

03

Causes and Pathophysiology

Causes an
Femur Fragility Fractured Risk Factors

02

Distinguishing features

Anatomy and Histology
Male Osteoporosis and Imaging

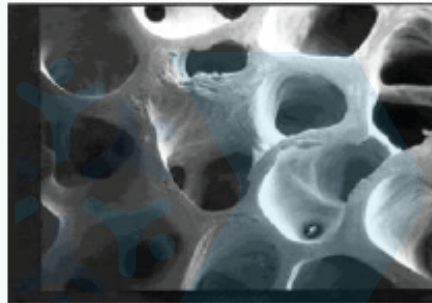
04

Treatment

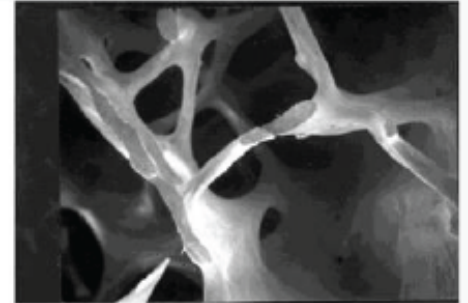
Androgen Therapy
Pharmacological Therapy

Introduction

Osteoporosis



Normal bone



Osteoporotic bone

❑ Osteoporosis is called the “silent disease”

- Osteoporosis: reduced bone mass and impaired structural integrity of the skeletal system
- Imbalance between bone formation and bone resorption
- Increased risk of fractures
- Elevates with age

❑ WHO criteria: Osteoporosis is defined as a BMD that lies 2.5 standard deviations or more below the average value (a T-score of ≤ -2.5 SD)*

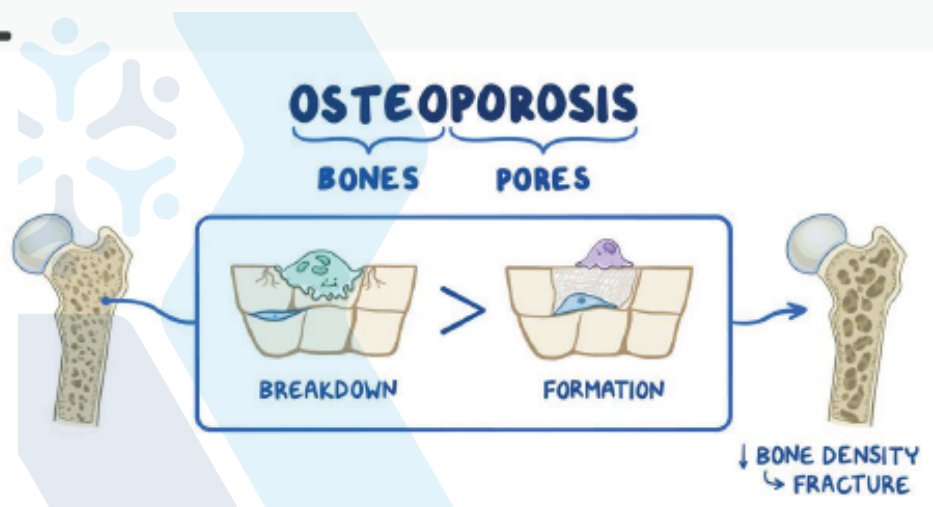
*World Health Organization. Assessment of Fracture Risk and Its Application to Screening for Postmenopausal Osteoporosis; Technical Report Series No. 843; WHO: Geneva, Switzerland, 1994; Available online: https://apps.who.int/iris/bitstream/handle/10665/39142/WHO_TRS_843.pdf?sequence=1 (accessed on 1 February 2021)

Introduction

Osteoporosis

Unbalanced activity

- Bone forming cells (osteoblasts)
- Bone resorbing cells (osteoclasts)



<https://www.osmosis.org/learn/Osteoporosis>

2020

Introduction



Gender Differences in Osteoporosis

- ❑ In 2010 in Europe, there were 22 million women and **5.5 million** men with osteoporosis, accounting for 2% of the overall burden of noncommunicable disease
- ❑ United States: a study showed a comparable prevalence of osteoporosis for **men aged 70** years or older and **women aged 65 years**
- ❑ The mortality rate associated with hip fractures, as well as vertebral and other major fractures, is **higher in men** than in women
- ❑ Men are even **less likely than** women to be evaluated or receive antiresorptive therapy after a hip fracture (4.5 versus 49.5%, respectively)

2020

Introduction

Gender Differences in Osteoporosis

Osteoporosis screening recommendations

Organization	Recommendations	
	Women	Men
National Osteoporosis Foundation	All women >65 years and postmenopausal women with risk factors	All men >70 years or men aged 50–69 years with risk factors
International Society for Clinical Densitometry		
Endocrine Society		
World Health Organization	Women >65 years old	No recommendation
American Association of Clinical Endocrinologist		
United States Preventive Services Task Force		
American Academy of Family Physicians		
Canadian Osteoporosis Society	Women >65 years	Men >65 years
American College of Physicians	Assess the risk factors and consider DXA scan for those at risk for osteoporosis	
UK National Osteoporosis Guideline Group		

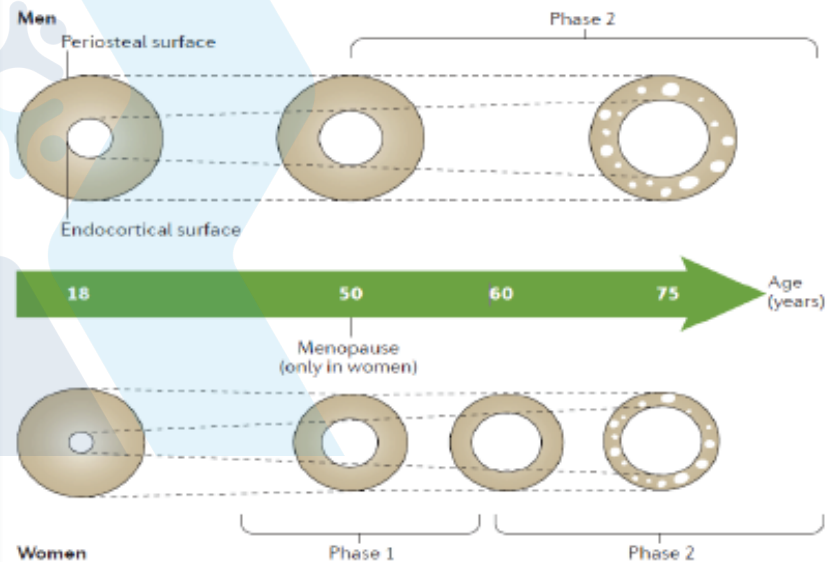


2020

Anatomy and Histology



- Adulthood:
 - Higher cortical thickness in men
 - From the fourth to sixth decades of life, trabecular bone volume fraction can decline by up to 40–50% for sexes



2020

Skeletal Sexual Dimorphism

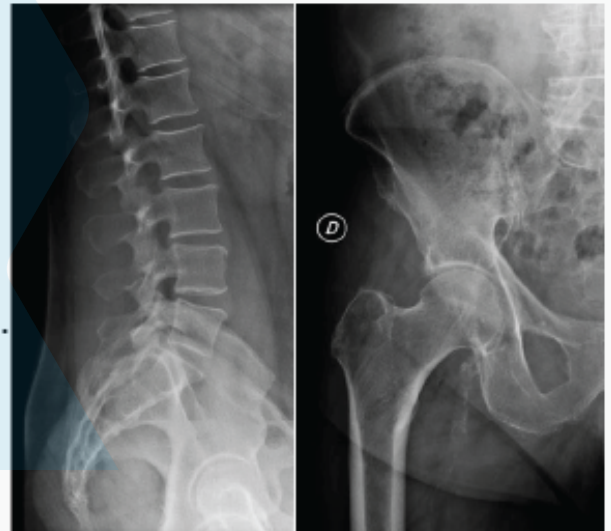


- **Sex Steroid Signaling in Bone:**
 - In men, about 15% of estradiol (E2) is produced directly from the testes, whereas the other 85% is the result of androgen peripheral aromatization
 - In **old men** total E2 levels remain a **sufficient** level to maintain skeletal homeostasis
- **Estrogen Deficiency: The Primary Reason of Bone Loss in Older Hypogonadal Men**
 - Low testosterone levels in hypogonadal men determined augmented **risk** of osteoporosis and fractures
 - In general, it seems that estrogens are more important compared with androgens in preserving bone health in aging men
 - Increased risk for hip fractures has been described in men with both reduced E2 and testosterone

Male Osteoporosis and Imaging

Conventional Radiography

- ☐ The first-line investigation
- ☐ Poor sensitivity
- ☐ Evaluating the secondary causes of osteoporosis: Glucocorticoid medications, Hypogonadism, Alcohol abuse, Smoking...
- ☐ The main radiographic findings:
 - Altered Trabecular Pattern
 - Cortical Thinning
 - Increased Radiolucency



"empty box" or "picture framing"

Male Osteoporosis and Imaging

Dual-Energy X-ray Absorptiometry

- ☐ Dual-energy X-ray absorptiometry (DEXA) is currently the standardized method

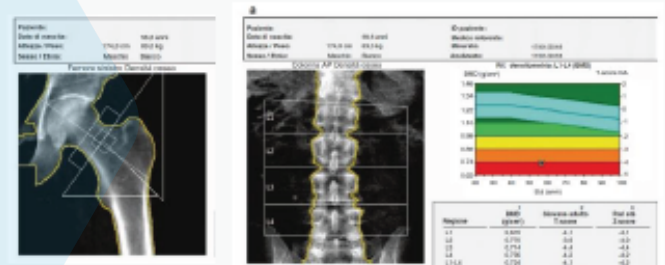


Table 4.1 WHO criteria for clinical diagnosis of osteoporosis

Diagnosis	BMD <i>T</i> -score
Normal bone mass	$T\text{-score} \geq -1$
Low bone mass (osteopenia)	$-1 > T\text{-score} > -2.5$
Osteoporosis	$T\text{-score} \leq -2.5$
Severe or established osteoporosis	$T\text{-score} \leq -2.5$ with existing fracture

Causes and Pathophysiology

The risk factors

Two main groups:

- Non-modifiable risk factors:** age, genotype, race, previous fragility fractures, and familial history of hip/vertebral fracture
- Modifiable risk factors:** low bone mineral density (BMD), low muscle mass, alcoholism, smoking, low body mass index (BMI < 20 kg/m²), low physical activity, reduced calcium intake and/or malabsorption, vitamin D deficiency, excessive sodium intake, the presence of osteoporosis-associated diseases, and the use of bone-resorbing drugs

Table 5.1 Primary and secondary causes of male osteoporosis

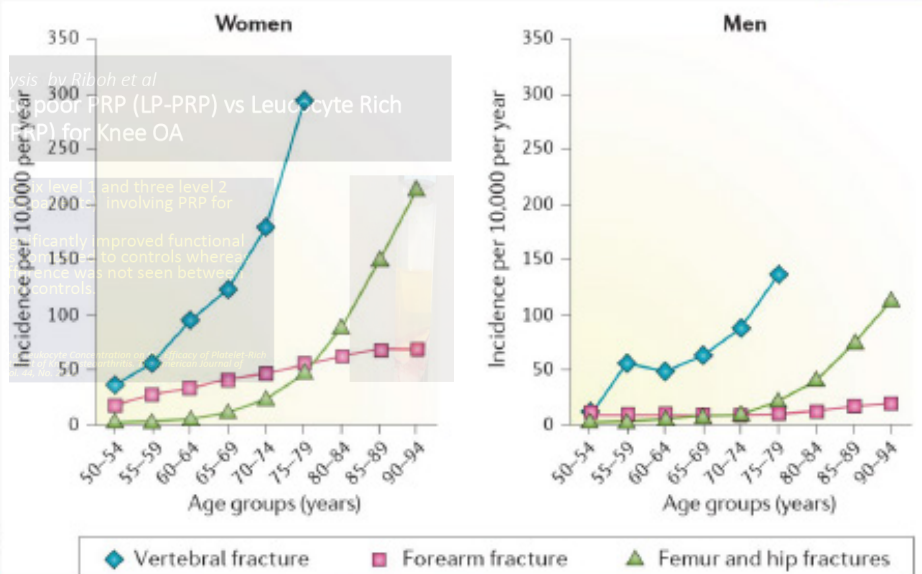
Causes

<i>Primary osteoporosis</i>
Age-related osteoporosis
Idiopathic osteoporosis
<i>Secondary osteoporosis</i>
<i>Drugs:</i> Corticosteroids, anticonvulsants, thyroid hormone, heparin, chemotherapeutics, thiazolidinediones
<i>Endocrine diseases:</i> Hypogonadism (Klinefelter syndrome, Kallmann syndrome, hypopituitarism, androgen deprivation therapy, hemochromatosis), hyperthyroidism, hyperparathyroidism, hypercortisolism, hyperprolactinemia, acromegaly, GH deficiency, diabetes mellitus (type 1 and type 2)
<i>Gastrointestinal diseases:</i> Celiac disease, gastrectomy/gastric bypass, chronic liver diseases, primary biliary cirrhosis, chronic inflammatory bowel disease, pancreatic insufficiency
<i>Systemic illnesses:</i> Rheumatoid arthritis, lupus erythematosus, ankylosing spondyloarthritis, myelo- and lymphoproliferative diseases, multiple myeloma, systemic mastocytosis
<i>Conditions associated with immobilization:</i> Parkinson's disease, paraplegia, poliomyelitis, cerebral palsy, muscular dystrophies
<i>Kidney diseases:</i> Idiopathic renal hypercalciuria, renal tubular acidosis, chronic kidney disease
<i>Other diseases:</i> Chronic obstructive pulmonary disease, anorexia nervosa, AIDS/HIV, amyloidosis, sarcoidosis, depression
<i>Miscellaneous and lifestyle choices:</i> Sedentary lifestyle, alcoholism, smoking, caffeine

Femur Fragility Fracture in Men



Fracture incidence with increasing age



Femur Fragility Fracture in Men

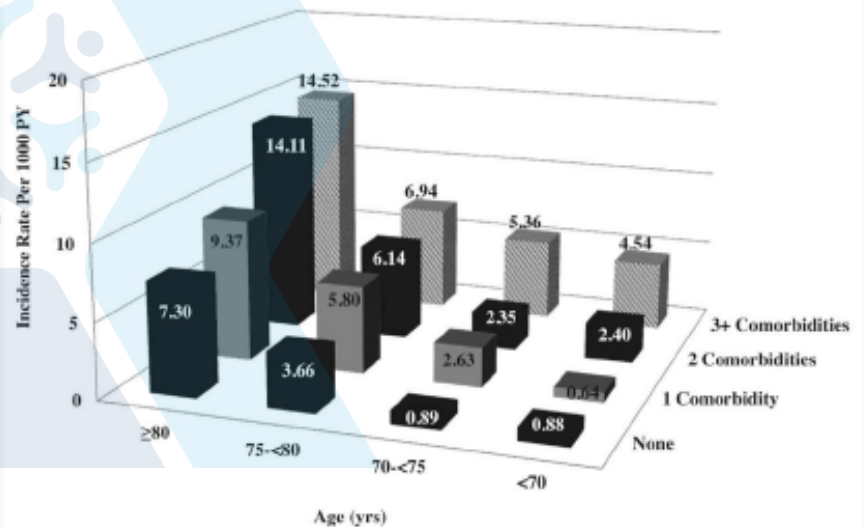
- ❑ A fragility fracture is a low-energy fracture that occurs when a patient falls from standing height or less
- ❑ Many studies have shown that after a femoral fragility fracture there is a 30% risk of having a new contralateral fracture of femur in the same year and 10% within 5 years

Box 1 | Drugs and diseases associated with increased fracture risk

- Drugs
 - Glucocorticoids
 - Aromatase inhibitors
 - Proton pump inhibitors
 - Glitazones (also known as thiazolidinediones)
 - Anti-epileptics
 - Loop-acting diuretics
 - Heparin and warfarin
 - Antidepressants
- Endocrine diseases
 - Anorexia nervosa
 - Hypogonadism
 - Cushing syndrome
 - Vitamin D deficiency
 - Hyperparathyroidism
 - Hyperthyroidism
 - Diabetes mellitus (type 1 and type 2)
- Gastrointestinal diseases
 - Malabsorption
 - Inflammatory bowel diseases
- Rheumatological diseases
 - Rheumatoid arthritis
 - Ankylosing spondylitis
- Haematological diseases
 - Multiple myeloma
 - Systemic mastocytosis
 - Leukaemia
- Neurological diseases
 - Stroke
 - Immobilization
 - Parkinson disease
- Other diseases
 - Congestive cardiac failure
 - Chronic obstructive lung disease
 - Chronic renal insufficiency
 - Osteogenesis imperfecta
 - Marfan syndrome
 - Ehlers-Danlos syndrome
 - Human immunodeficiency virus infection (and its treatment)

Femur Fragility Fracture in Men

- ❑ Almost 30% of hip fractures occur in men
- ❑ The incidence of hip fracture increased with increasing number of comorbidities
- ❑ The highest incidence of hip fracture was observed in men age ≥ 80 years with 3 or more comorbidities



Incidence of hip fracture by age and number of comorbidities

Femur Fragility Fracture in Men

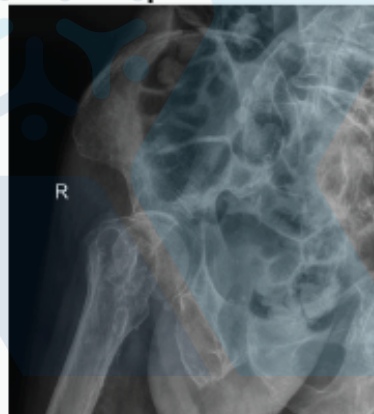
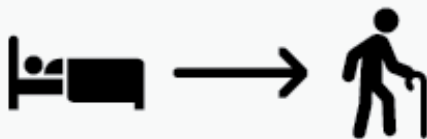
- ❑ Although the number of hospitalizations was higher in elderly women with multiple comorbidities, the **male mortality was higher**

Variables	Relative Risk (RR)	
	RR (95% IC)	p-value
Block 1 -Demographic		
Sex		0.4394
Women	1	-
Men	1.18 (0.78-1.79)	0.4394

Femur Fragility Fracture in Men

☐ Tam Anh hospital - Males hip fracture

- 2021 – 2023: 29 cases
- Average age: 74

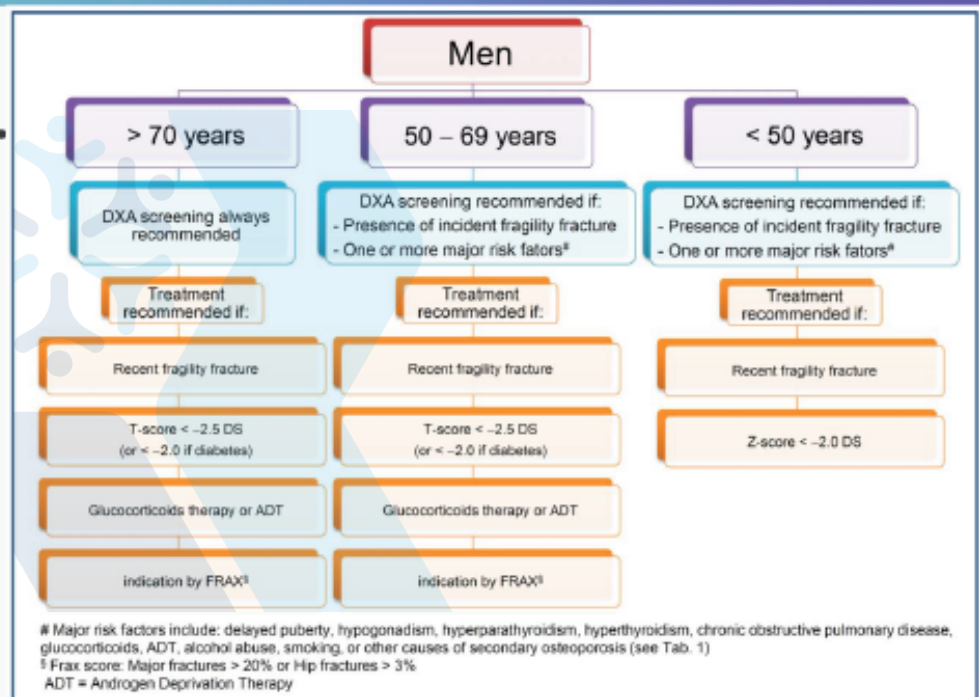


Male – 1922 – Right Hip Fx
28/10/2023

Comorbidities: congestive heart failure, anemia, GERD, pleural effusion, DVT, malnutrition.



Treatment



Testosterone

- ❑ In the Osteoporotic Fractures in Men study, the odds of having osteoporosis at the hip tripled, as did the odds of experiencing rapid hip bone loss in men with baseline testosterone levels below 200 ng/dL (6.9 nmol/L) vs. men with testosterone levels above 200 ng/dL (6.9 nmol/L)
- ❑ Men whose serum testosterone level is 200–300 ng/dL (6.9–10.4 nmol/L) or below appear to be at higher risk for bone loss and fracture and are more likely to have a favorable response to TT

Absolute contraindications against testosterone treatment

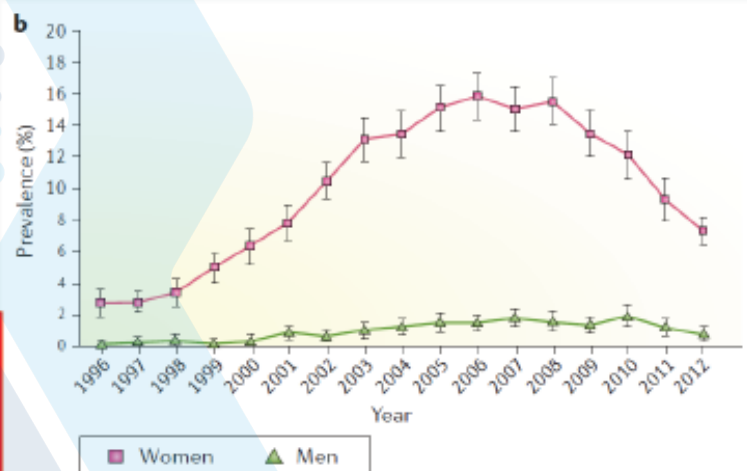
Diagnostic suspect or diagnosis of prostatic carcinoma
PSA level > 4 ng/mL (or > 3 ng/mL Afro-Americans)
Breast cancer
Severe obstructive apnea
Male infertility
Hematocrit (Hct) >52% or/and high risk of venous thromboembolism
Severe lower urinary tract symptoms associated with benign prostate hyperplasia

Pharmacological Therapy

Alendronate

Alendronate-treated patients experienced a significantly lower incidence of new vertebral fracture compared to placebo-treated subjects (OR = 0.36, 95% CI: 0.14–0.94), and a non-significant lower incidence of new nonvertebral fracture with alendronate was also reported

The benefits of alendronate therapy in men with osteoporosis were very similar to those in postmenopausal women

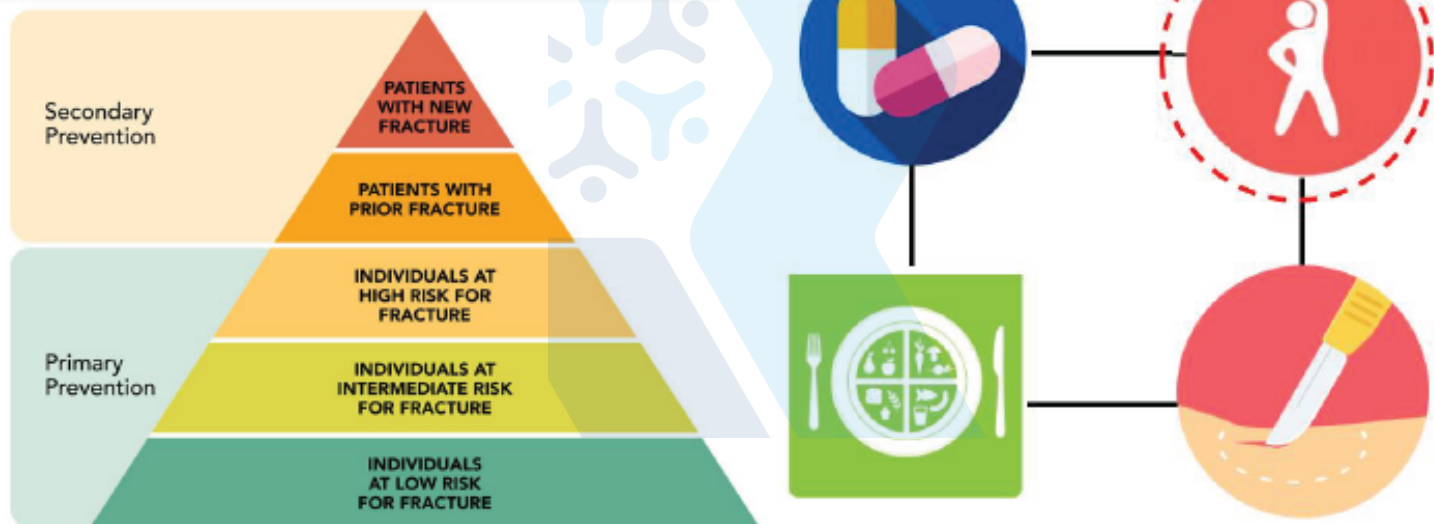


Evolution of fracture incidence and bisphosphonate use
Prevalence of bisphosphonate use among men and women ≥ 55 years of age

HỘI NGHỊ THƯỜNG NIÊN NĂM 2024

LIÊN CHI HỘI BỆNH TỰ MIỄN CƠ XƯƠNG KHỚP TP.HỒ CHÍ MINH

Treatment



OKVITKA - Calcium 300mg & Vitamin D3 200 IU - Sản xuất tại Úc



PHÒNG NGỪA GÂY XƯƠNG MỀM SAU TÁI GÂY XƯƠNG

- Bổ sung Calcium
- Bổ sung Vitamin D
- Tập thể dục thường xuyên
- Giảm nguy cơ té ngã
- Giữ cân nặng hợp lý
- Ngưng hút thuốc, giảm rượu bia



OKVITKA - Calcium 300mg & Vitamin D3 200 IU - Sản xuất tại Úc



Summary

- ✓ The bone characteristics of men exhibit some differences
- ✓ Osteoporosis in men is a reality
- ✓ Hinger mortality with hip fracture
- ✓ Prevention of osteoporosis inn men not enough

Thank you